Diet, Weight, and Physical Activity Coordination Group

Nutrition-related research within the Division of Cancer Control and Population Sciences (DCCPS) is very broad, including the subject areas of diet, weight and physical activity and encompassing the three program areas of surveillance, epidemiology and behavior, as well as cancer survivorship. Because there are overlapping concerns among the program areas and because developments in any one area can benefit the others, a Diet, Weight, and Physical Activity (DWPA) Coordination Group was convened in the fall of 1998, composed of staff within the Division who work in these areas.

The aims of the group are to:

- Coordinate nutrition-related research efforts within the Division of Cancer Control and Population Sciences (DCCPS), and
- Integrate those efforts within the broad field of nutrition-related research throughout the National Cancer Institute (NCI) and the National Institutes of Health (NIH).

Division of Cancer Control and Population Sciences:
http://dccps.nci.nih.gov/

National Cancer Institute:
http://www.nci.nih.gov/

Related websites from the National Institutes of Health (NIH)

National Institutes of Health's Division of Nutrition Research Coordination:
http://www.niddk.nih.gov/federal/dnrc.htm

Weight-Control Information Network:
http://www.niddk.nih.gov/health/edu.htm#win

Major activities within the group include:

- Updating and informing members through an initial review of selected summary references and ongoing reviews of current relevant literature
- Identifying areas which would benefit by seeking perspectives of outside experts
- Identifying research opportunities in the area of diet, weight, and physical activity and planning research efforts across program areas of epidemiology, surveillance, behavioral research, and cancer survivorship
- Ensuring scientific basis for proposed concepts is sound and reflects most current perspectives of areas of greatest promise and need
- Informing one another of ongoing research efforts, findings, and related activities that may influence planning for new initiatives
- Discussing implications of research findings for future research efforts
- Ensuring that nutrition-related research efforts within the Division of Cancer Control and Population Sciences (DCCPS) are informed by and coordinated with nutrition-related research throughout the National Cancer Institute (NCI) and the National Institutes of Health (NIH).
- Having representation on relevant external federal and professional committees
- Considering external requests for support for nutrition-related research (e.g., requests from other agencies and institutes)

These activities are not viewed as steps along a linear path, but rather positions in a cyclical process of planning, implementing, and integrating.

Research Opportunities:

The group identified a set of key research areas relevant to the mission of Division of Cancer Control and Population Sciences (DCCPS), noted where expert opinion was needed for further clarification of the status of research and developed a broad list of selected examples of potential future research opportunities. The document covered only those areas consistent with the Division focus; it did not, for example, cover basic science research on the etiologic mechanisms related to diet, weight, or physical activity. Furthermore, it does not duplicate the November 1999 Report of the Division of Cancer Prevention's Nutrition Implementation Group, *New Directions for Nutritional Research at the National Cancer Institute*, because that report specifically excluded nutrition-related research in the areas of epidemiology, surveillance, and behavior.

Click below to see the list of selected examples of future research opportunities for each area suggested in the Diet, Weight, and Physical Activity (DWPA) group's working report. This list is not comprehensive but intended to give a sense of the scope of research that will be supported in the Division. Please visit our other relevant web pages to obtain a more detailed description of current active research supported by the Division of Cancer Control and Population Sciences (DCCPS) in these critical areas of cancer control.

- Diet
- Weight
- Physical Activity

While not detailed in this brief report, the group recognized the critical need for research that explores the effects of the interactions of diet, weight and physical activity across the spectrum of surveillance, epidemiology, and behavioral research.

November 1999 Report of the Division of Cancer Prevention's Nutrition Implementation Group, *New Directions for Nutritional Research at the National Cancer Institute*: http://dcp.nci.nih.gov/rpts/nutrition/

Other Relevant Web Pages

Risk Factor Monitoring and Methods Branch:
http://www-dccps.ims.nci.nih.gov/ARP/RiskFactor/riskdesc.html

Health Promotion Research Branch active grants list:
http://dccps.nci.nih.gov/HPRB/research.html#list

Applied Sociocultural Research Branch active grants list:
http://dccps.nci.nih.gov/ASRB/research.html

5ADay website:
http://dccps.nci.nih.gov/5aday/default.html

Analytic Epidemiology Research Branch:
http://www-dccps.ims.nci.nih.gov/EGRP/aerb.html

Office of Cancer Survivorship:
http://dccps.nci.nih.gov/ocs/

DIET

Epidemiology

Associations

- Examine in epidemiologic and feeding studies, associations with specific foods and dietary patterns, as well as individual nutrients. Examples of specific issues to be explored are:
    - Which types of fruits and vegetables confer the most protective effect
    - The associations of different sources of meat and associated components, such as heterocyclic amines, with specific cancers
    - Quantify the effects of individual and classes of fatty acids, such as trans and omega-3 fatty acids, on specific cancers.
- Explore the influence of alcohol on cancers other than upper respiratory/GI malignancies, and the interaction of alcohol and tobacco exposure.
- Quantify and compare the risk of pesticide exposure from various sources, such as foods, ground water and other sources; Determine effective methods of communicating the relative benefit of consumption of fruits and vegetables versus the risk of ingestion of pesticides from these sources.
- Examine, more systematically, the effects of dietary supplements and functional foods both as separate behaviors and in combination with nutrients from foods.

Mechanisms

- Examine associations of *in utero* exposures to diet, alcohol, hormones and birth weight with cancer risk throughout life.
- Design cohort studies of children and adolescents to determine mechanisms by which diet during these periods of life influences cancer risks.
- Explore across the lifecycle, the potential interaction between diet and related risk factors, such as physical activity, body weight, tobacco use, and underlying physiologic mediators, such as alterations in hormonal milieu, metabolizing enzymes, and oxidative status.
- Examine hypotheses concerning diet as a modulator of gene expression.
- Determine diet's role in development of precursor lesions other than colonic polyps, such as atypical hyperplasia or dysplasia of the breast and cervix.

Methods

- Explore the potential sources of bias in case/control versus cohort studies and quantify their effect on the magnitude of relative risk estimates

Populations and Subgroups

- Determine whether dietary factors influence cancer risk differentially in diverse ethnic/racial populations, particularly US Hispanics, Native Americans, Koreans, and Vietnamese, on whom there are only limited data.
- Evaluate the effect of diet among groups at high risk for cancers due to other health behaviors, such as tobacco use, heavy alcohol use, low physical activity, and high risk sexual practices.
- Assess influence of diet on second occurrence of cancer and long term prognosis among cancer survivors.
- Determine, among cancer survivors, the influence of diet on cancer treatment, quality of life, and prognosis.

Surveillance

Methodology

- Identify sources of measurement error in dietary assessment for specific foods and nutrients; improves self report and biologic methods of dietary assessment and statistical analysis to reduce measurement error.
- Identify which biomarkers, in terms of accuracy, feasibility, reliability, and expense, are most promising for large national surveys and population-based studies.
- Support additional days of recall data and food frequency questionnaire in the National Health And Nutrition Examination Survey and develop understanding of statistical issues surrounding assessment of usual intakes.
- Develop methods of characterizing dietary patterns and statistical approaches to determining associations with cancer.
- Develop ability of nutritional monitoring and nutrient composition databases to quantify red meat intakes, link fat to lean portions, and track cooking temperatures, preparation, and preservation methods.
- Expand food composition databases to improve the intake estimates for emerging dietary constituents relevant to cancer, such as individual and classes of fatty acids, types of fiber, and phytochemicals.

Monitoring

- Track intakes of foods, nutrients, and other dietary components most relevant to cancer at the population level among the general population and among at-risk subgroups. Assess demographic and other factors that affect changes in intake of these components.
- Examine environmental/organizational/system effects on food intake; examples include factors reducing intake of recommended foods, such as availability, persishability and affordability of fruits and vegetables; and factors competing with recommended foods, such as low cost and ubiquitous supply of high fat and high sugar processed snack foods.

Populations and Subgroups

- Assess dietary intakes among the general population, but also among selected subgroups defined by gender, age, race/ethnicity, and social class.
- Determine dietary practices among cancer survivors; elucidate prevalence of use and impact of special diets intended to prevent second occurrence of cancer and improve quality of life.
- Adapt improved dietary assessment instruments for specific cultural groups in order to capture cultural dietary diversity but allow comparison across diverse populations.

Behavioral Research

Mechanisms

- Identify the differential contributions of the components of effective multi-component interventions to dietary behavior change.
- Directly test competing theories within dietary behavior studies by using appopriate study designs and process measurement.
- Expand the evidence about individual-level determinants of secular trends, such as interactions between awareness about healthful eating, concern, and action.
- Incorporate cost-effectiveness analyses into intervention studies more consistently, given that more intensive interventions tend to produce greater changes; compare cost of alternative approaches in the same population.

- Utilize state of the art statistical and program evaluation methods to assess and interpret the impact of interventions.
- Study the determinants of dietary behavior and change processes involving relationships among the various eating behaviors that constitute "total eating patterns".
- Explore the determinants of diet relative to other behaviors, such as alcohol use, caffeine intake, tobacco use, exercise and drug use.
- Examine whether combining biological variables with psychosocial determinants can improve the predictiveness of models of dietary behavior.
- Assess how new information technologies and advances in communication can be used to improve adoption of recommended dietary habits and reduce health disparities.

Methodology

- Conduct methodological research on the development and refinement of:
    - tools for evaluating eating behavior and food-related behavioral change skills;
    - innovative data collection tools for intended outcomes, including both objective measures of behavior and antecedent variables;
    - brief, valid methods that can be practically applied to large populations;
    - characterization of complex causal behavioral pathways for long-term dietary patterns using sophisticated analytic techniques; and
    - instruments designed to measure similar constructs, to increase discriminant validity and reduce redundancy.

Populations and Subgroups

- Conduct longitudinal studies of determinants of food choices and eating patterns, utilizing sophisticated multivariate modeling techniques.
- Conduct carefully designed ethnographic investigations to better understand the role of sociocultural factors in diet.
- Investigate the effect on dietary behavior of family influence processes, such as food-related roles in shopping and preparation, food availability in homes, and family gathering for meals.
- Examine the impact of different intervention strategies on groups at high risk either because of familial, demographic, social, or behavioral factors that may increase their cancer risk.
- Investigate strategies to identify and modify unhealthy food preferences and eating patterns that occur early in life and have been demonstrated to persist into adulthood.

System Changes

- Investigate the impact of environmental and policy interventions used alone, or in combination with, nutrition education and promotion strategies;
- For public health policies, evaluate economic incentives to increase production, sale, or purchase of healthy foods, and legislation governing food advertising and food availability.
- Develop high quality measures of the social-ecological environment for food selection.

WEIGHT

Epidemiology

Mechanisms and Measures

- Conduct large population-based studies to examine the association of obesity with cancer and the influence of underlying mediating factors, such as endogenous and exogenous estrogen metabolism, hormone receptor status, family history of cancer, and genetic predisposition.
- Examine the effect of weight change on underlying metabolic processes postulated to influence cancer risk, in epidemiologic and clinical metabolic studies.
- Examine whether the effect of increased weight, weight gain and body fat distribution on cancer incidence and prognosis varies by stage at diagnosis.
- Examine the influence of increased weight, weight gain and body fat distribution on cancer risk and prognosis throughout the lifecycle.
- Determine whether energy flux, defined as the level of energy expenditure at which energy balance occurs, influences cancer risk: one methodologic approach is to include measures of physical activity in studies of body weight, weight gain, and cancer risk.

Populations and Subgroups

- Quantify the effect of overweight and weight gain on cancer risk among ethnic or racial sub-populations such as non-Hispanic black women and Mexican-American women and men, and determine what factors modify that risk.
- Examine whether obesity *in utero*, and in early childhood or adolescence increases cancer risk.

Surveillance

- Identify, measure, and monitor factors that influence weight gain and central body fat accumulation in children and adults, including those at the individual, organizational and societal levels.
- Obtain longitudinal data on sample of US population to evaluate individual, societal, and system predictors of weight change.
- Identify characteristics of individuals who are successful at avoiding weight gain or initiating and maintaining sustained weight loss; add assessments of these characteristics, along with detailed measures of physical activity and weight history to national surveys that collect food consumption data.
- Obtain longitudinal data on cancer patients and survivors to examine how weight at diagnosis and weight change during and after treatment influences cancer prognosis.

Behavioral Research

- Determine which mix of modalities (physical activity and/or dietary change) works in different subpopulations to achieve and maintain a healthy weight.
- Identify characteristics of persons who successfully maintain healthy weight over a lifetime and after weight loss; explore this in populations that have never been overweight and obese as well as those who have been obese and successfully lost weight.
- Determine what types of long-term weight loss diets are most effective.

- Determine what behavioral strategies work best within cancer high-risk reduction contexts.
- Examine implications of new pharmacological interventions for weight loss for cancer prevention and prognosis.
- Develop and evaluate interventions and other strategies that prevent or diminish the effect of adverse physiologic or psychosocial sequelae of cancer survivorship. Develop studies that measure the impact of behavioral interventions on subsequent health outcomes and practices.
- Elucidate need for and develop educational and training programs pertaining to diet, weight, and physical activity for the cancer survivor, their significant others, and family members.

PHYSICAL ACTIVITY

Epidemiology

Associations and Mechanisms

- Expand research on the association between physical activity and a number of cancer sites.
- Identify what characteristics of physical activity (in terms of frequency, intensity, types) are protective for specific cancer sites; one specific issue is the effect of accumulated bouts of activity.
- Explore the potential interaction of weight and physical activity for cancer risk.
- Examine the effect of physical activity on underlying metabolic processes postulated to influence cancer risk using clinical metabolic studies.

Methodology

- Improve and standardize methods for assessment of physical activity, especially those for lifetime history, adolescent and young adult physical activity.
- Identify appropriateness of limited and comprehensive assessment methods for specific research questions.

Populations and Subgroups

- Expand data on the association of physical activity with site specific cancer for diverse populations defined by age, income, education and race or ethnicity.
- Evaluate the benefit of physical activity in improving quality of life for cancer survivors, including examination of longer term effects on prognosis and survival.
- Routinely monitor school policy requirements and of students' participation in physical education classes in elementary, middle, and high schools.

Surveillance

Methods

- Validate past reports of physical activity from different periods in life, including childhood and adolescence, in previously assessed cohorts
- Develop methods to assess accumulated short bouts of activity**.**
- Assess past physical activity to determine if physical activity during youth is relevant to outcomes in mid-life or later.
- Evaluate the prevalence and impact of sequelae, such as cardiac failure due to adriamycin-based regimens, on diet, weight, and physical activity behaviors among cancer survivors.
- Assess the impact of diagnosis- or treatment-related functional changes, such as lymph edema and fatigue, on physical activity and weight among cancer survivors.
- Elucidate the effect of physical activity interventions on fatigue among cancer survivors.
- As noted in the *Surgeon General's Report on Physical Activity and Health* (1996):
    - Develop methods to monitor patterns of regular, moderate physical activity.
    - Improve the validity and comparability of self-reported physical activity in national surveys.

Behavioral Research

- Examine the impact of physical activity and physical activity interventions on other cancer-related risk behaviors.
- Examine the impact of psychosocial sequelae of survivorship on weight, weight management, physical activity, and diet. Examples are:
    - Adaptation to personal consequences: The impact of altered self-concept, body image, and uncertainty on diet, weight, and physical activity. The positive effect of diet, weight, and physical activity interventions on personal autonomy, coping skills, intimacy, and interpersonal or family interactions;
    - Adjustment to social consequences: The effect of altered work and family roles and functions on diet, weight, and physical activity.
- As recommended by the *Surgeon General's Report on Physical Activity and Health*:
    - Assess determinants of physical activity for various population subgroups (e.g., by age, sex, race/ethnicity, socioeconomic status, health/disability status, geographic location).
    - Examine patterns and determinants of physical activity at various developmental and life transitions, such as from school to work, from one job or city to another, from work to retirement, and from health to chronic illness.
    - Evaluate the interactive effects of psychosocial, cultural, environmental, and public policy influences on physical activity.
    - Develop and evaluate the effectiveness of interventions that include policy and environmental supports.
    - Develop and evaluate interventions designed to promote adoption and maintenance of moderate physical activity that address the specific needs and circumstances of population subgroups.
    - Develop and evaluate the effectiveness of interventions to promote physical activity in combination with healthy dietary practices that can be broadly disseminated to reach large segments of the population and can be sustained over time.